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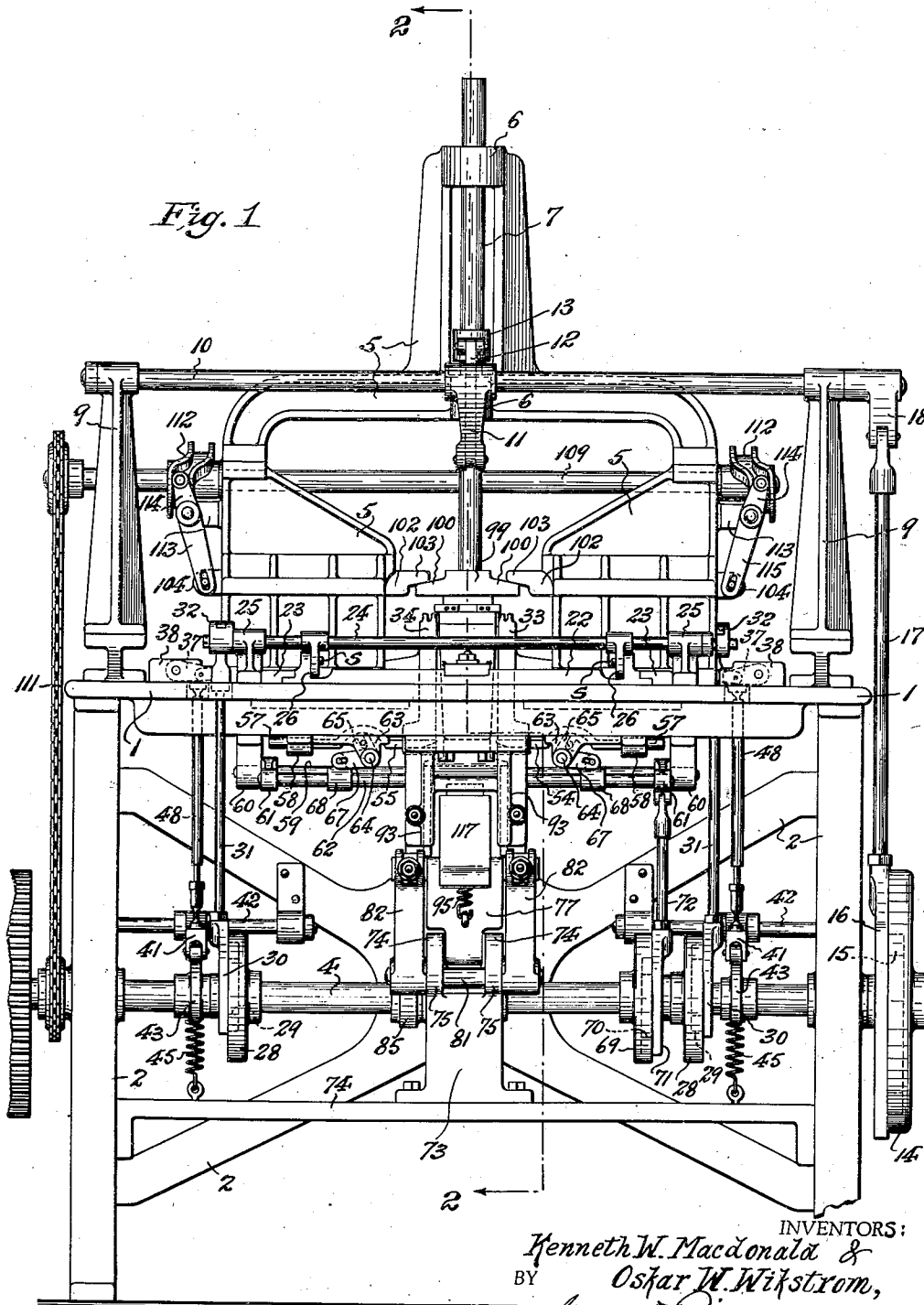
K. W. MACDONALD ET AL

2,243,352

PAPER CONTAINER FORMING MECHANISM

Filed Oct. 8, 1940

5 Sheets-Sheet 1



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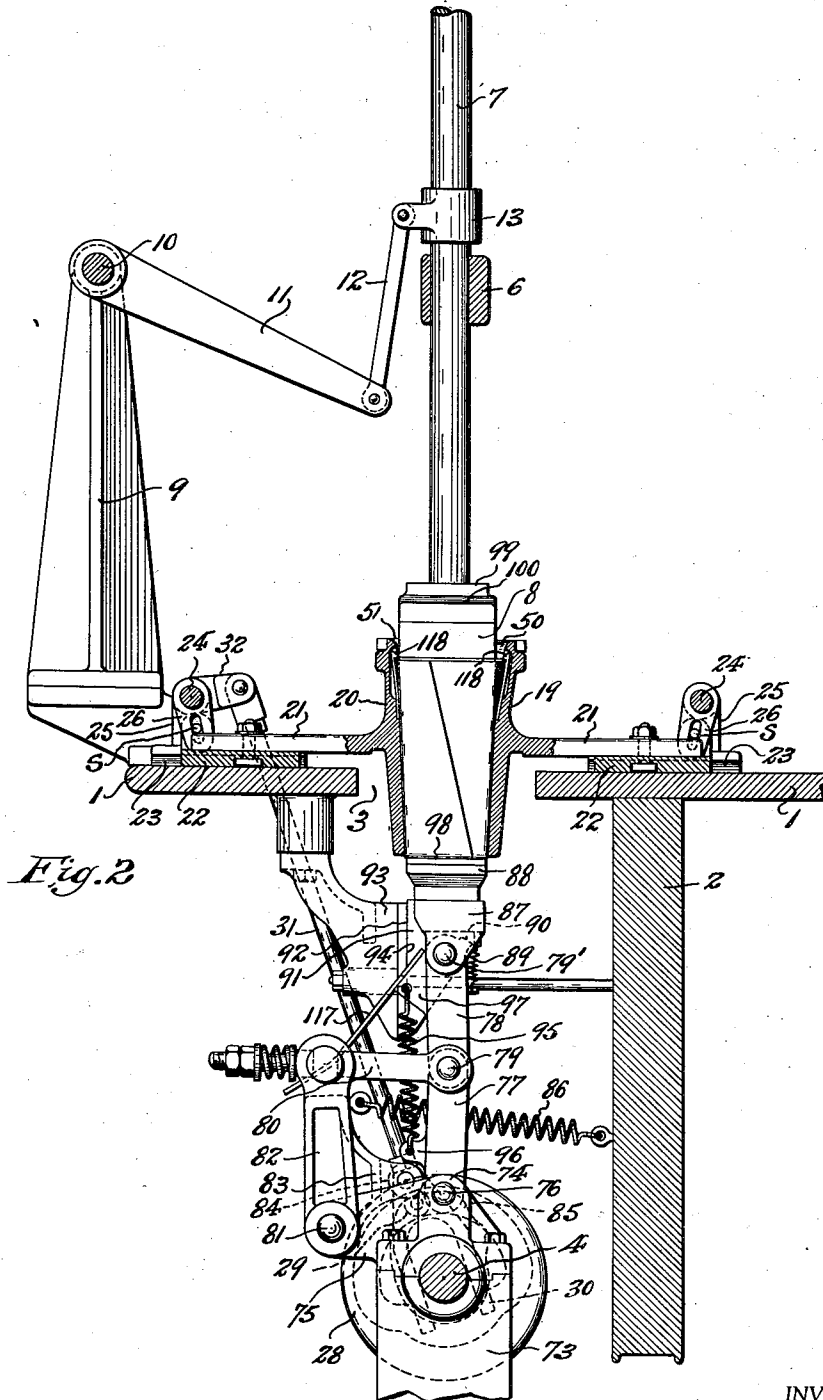


Fig. 2

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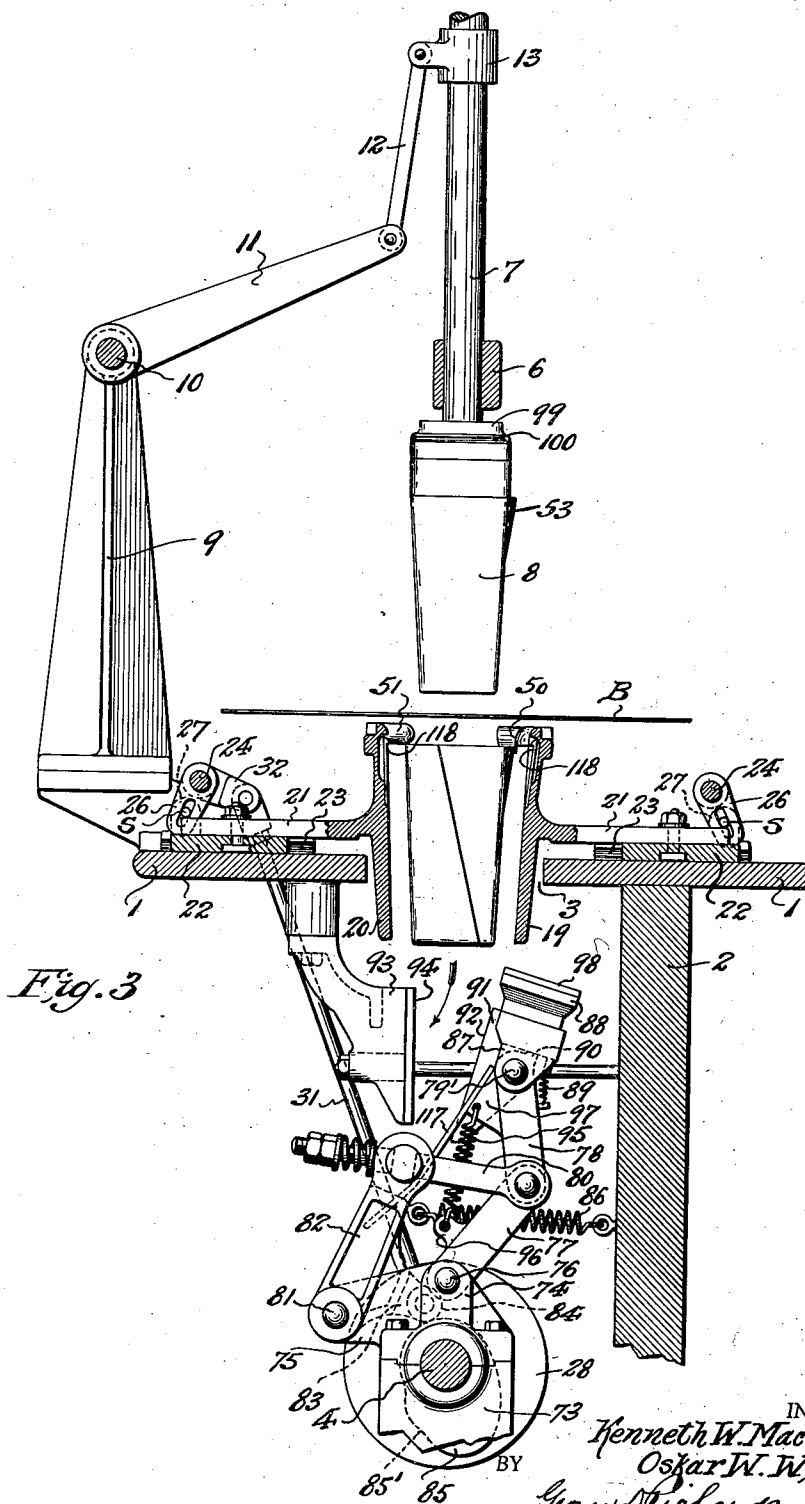
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5 Sheets-Sheet 3



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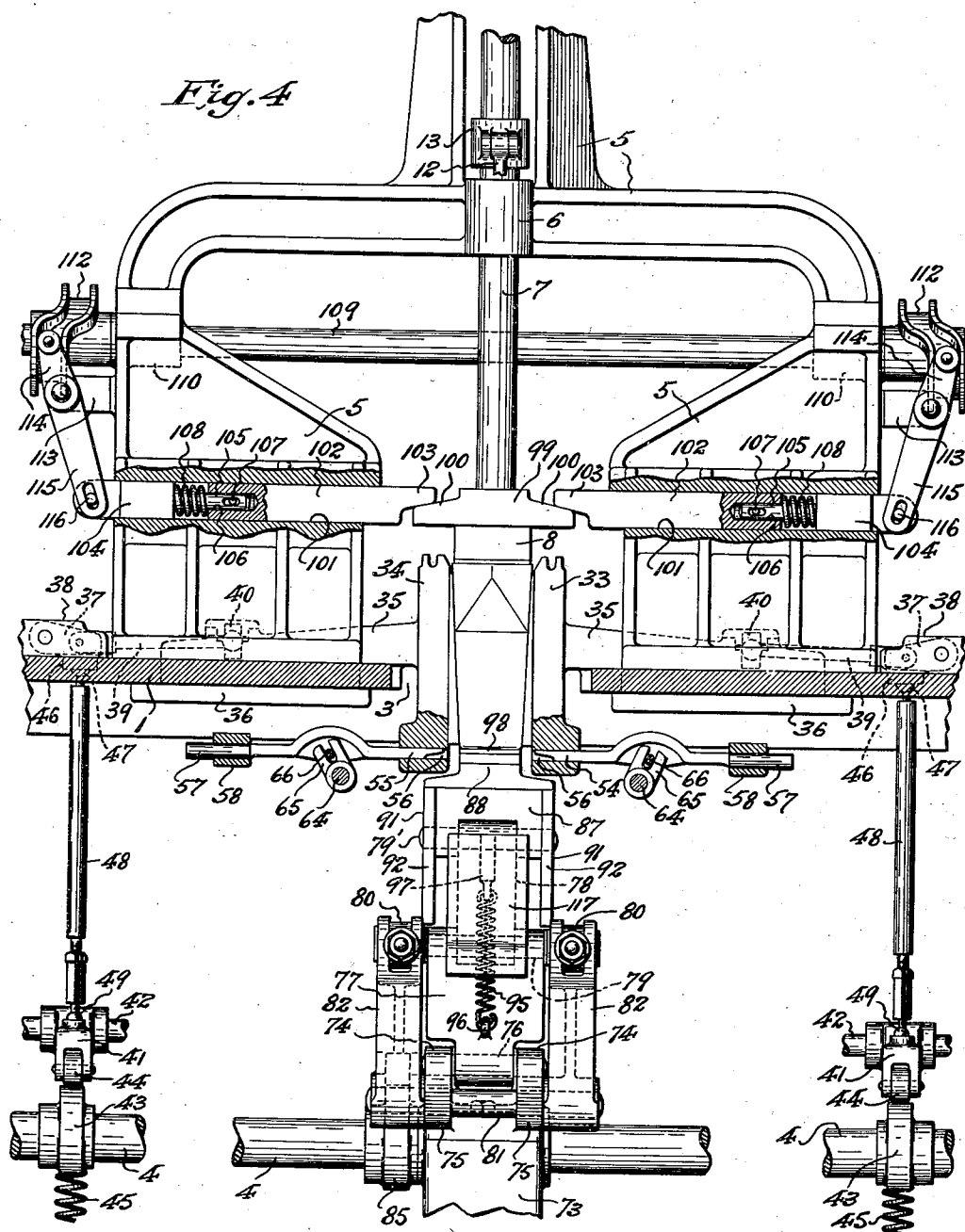
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5 Sheets-Sheet 4



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PAPER CONTAINER FORMING MECHANISM

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5 Sheets-Sheet 5

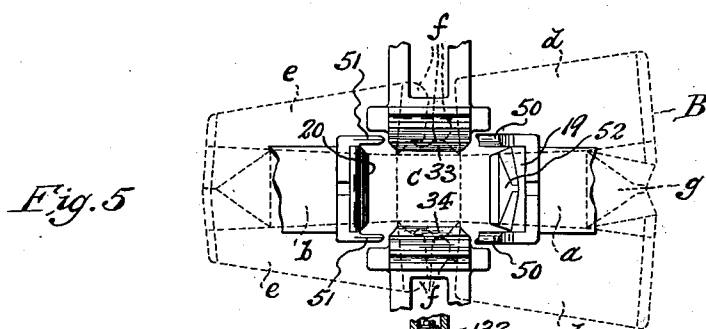
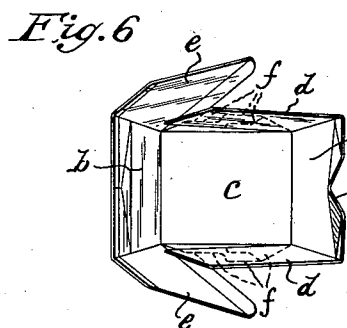
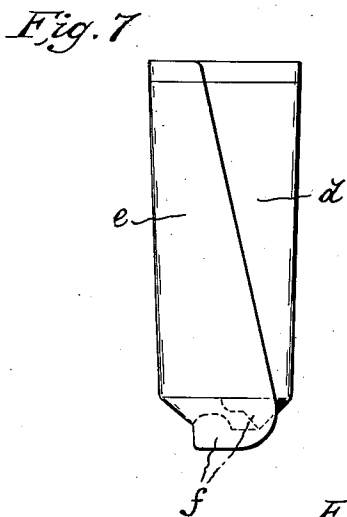
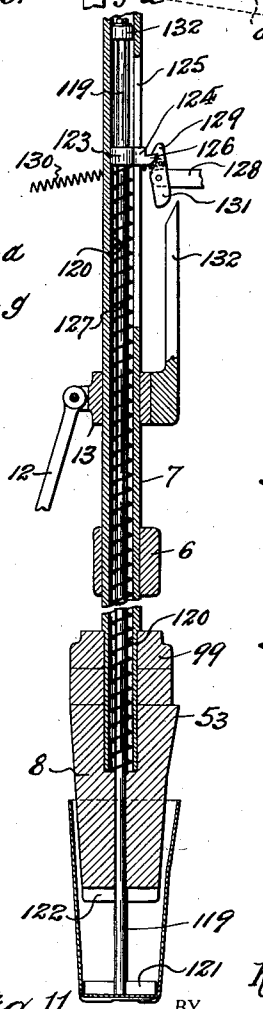
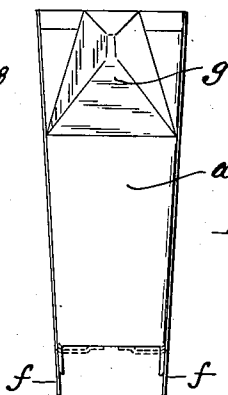
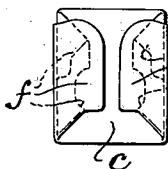
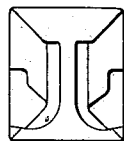


Fig. 11

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UNITED STATES PATENT OFFICE

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PAPER CONTAINER FORMING MECHANISM

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Application October 8, 1940, Serial No. 360,212

20 Claims. (Cl. 93—51)

This invention relates to improved mechanism for making containers from paper or like material; and the invention has reference, more particularly, to improvements in paper container making machines of the type known to the art as Brightwood automatic box machines.

This invention has for an object to provide automatic mechanism for forming leak-proof containers from suitable paper or like blanks, and, more particularly, for forming paper containers for liquid products of the general type and kind disclosed, for example, in U. S. Patent 2,158,097.

The invention has for a further object to provide, in automatic mechanism of the kind mentioned, in combination with a reciprocable forming plunger and cooperating blank folder means, means to apply strong bottom sealing pressure to the formed container while the same is supported by the forming plunger, including automatic means to brace and hold the latter against the thrust of such applied bottom sealing pressure.

The invention has for another object to provide means for automatically displacing the bottom sealing pressure applying means preparatory to stripping a formed container from the supporting forming plunger for discharge from the machine.

Other objects of this invention, not at this time more particularly enumerated, will be understood from the following detailed description thereof.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which:

Fig. 1 is an elevational view of a container forming mechanism according to this invention; Fig. 2 is a fragmentary longitudinal vertical section therethrough, taken on line 2—2 in Fig. 1; Fig. 3 is a view similar to that of Fig. 2, but showing the disposition of the parts thereof preparatory to discharge of a formed container and to forming of a succeeding container; Fig. 4 is an enlarged fragmentary view similar to that of Fig. 1, but with parts shown in transverse vertical section; Fig. 5 is a fragmentary plan view of blank folder means in initial open position shown in Fig. 3, and with the blank, to be folded thereby about the descending forming plunger, shown by broken lines.

Figs. 6 to 9 inclusive show various conditions of a blank as manipulated to form the ultimate container.

Fig. 10 is a plan view of the face plate of the

bottom sealing pressure applying means of the mechanism.

Fig. 11 is a sectional view of the forming plunger equipped with a modified type of formed container stripping or shedding means.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

Referring to the drawings, the table 1 of the machine is supported by the machine framework 2. This table 1 is provided with a suitably located opening 3. Journaled in the machine framework 2, to extend transversely beneath the table 1, is the main drive shaft 4, which itself is driven from a suitable power source by any suitable form of power transmission means.

Mounted on the table 1, so as to straddle said opening 3, is a transversely disposed overhead frame 5 which is provided with vertically spaced bearings 6 aligned above said opening 3. Slidably supported by said bearings 6 is the plunger rod 7 of a vertically reciprocable forming plunger 8. The means for producing timed reciprocation of said forming plunger 8 comprises, a pair of transversely spaced bearing standards 9 affixed to and extending upwardly from said table 1, and a rock-shaft 10 journaled in and between said bearing standards. Affixed to said rock-shaft is a lever arm 11, the free end of which is connected by a link 12 to a coupler collar 13 affixed on said plunger rod 7, whereby rocking motion of said rock-shaft is translated into vertical reciprocable motion of said plunger rod 7 and the forming plunger 8 carried thereby. Timed actuation of said rock-shaft 10, with consequent timed reciprocation of the forming plunger 8, is produced by a race cam 14 mounted on the drive shaft 4, the race of which is engaged by the roller stud 15 of the fork 16 of a connecting rod 17, the upper end of the latter being pivotally connected with an actuator lever arm 18 fast on said rock-shaft 10.

The reciprocable forming plunger 8 cooperates with a container forming throat which is defined by folder plate mechanism and side pressure plate mechanism mounted on the table 1.

The folder plate mechanism comprises a pair of longitudinally aligned opposed folder plates 19 and 20. Each folder plate is provided with a tail-piece 21 adjustably secured to a carriage plate 22 which is slidably reciprocable on the table 1, between channeled guideway members 23 affixed to the latter. The means for producing operative movements of said folder plates 19 and 20 toward and from one another comprises,

in cooperation with the carriage plate 22 of each, a transverse rock-shaft 24 journaled in and between bearing members 25 which are affixed to said table 1 to upstand therefrom. Fixed on said rock-shaft 24 are slotted lever arms 26 which pivotally engage the studs *s* of ears 27 which project upwardly from the underlying carriage plate 22. Timed actuation of said rock-shaft 24, with consequent timed reciprocation of said underlying carriage plate 22 and the folder plate carried thereby, is produced by a race cam 28 mounted on the drive shaft 4, the race of which is engaged by the roller stud 29 of the fork 30 of a connecting rod 31, the upper end of the latter being pivotally connected with an actuator lever arm 32 fast on said rock-shaft 24.

The side pressure plate mechanism comprises a pair of transversely aligned opposed presser plates 33 and 34. Each presser plate is provided with a tail-piece 35 slidably mounted in ways 36 formed in connection with the table 1. The means for producing operative movements of said presser plates 33 and 34 toward and from one another comprises, in connection with the tail-piece of each, a toggle press mechanism. This toggle press mechanism is formed by thrust lever 37 pivotally connected with an anchor block 38 affixed to the table 1. Pivotally connected with the free end of said thrust lever 37 is the rearward end of a link lever 39, the forward end of which engages a pivotal coupler block 40 carried by the tail-piece of the served presser plate. Timed actuation of said toggle press mechanism, with consequent timed reciprocation of the served presser plate, is produced by an actuator lever 41 mounted on a fulcrum shaft 42 supported in connection with the machine framework 2, which actuator lever is operated by a cam 43 mounted on the drive shaft 4 and adapted to engage an anti-friction roller 44 with which the free end portion of the actuator lever is provided. A pull-spring 45, suitably anchored to the machine framework, holds said actuator lever 41 in operative relation to the cam 43. Provided at the underside of the free end portion of the thrust lever 37 is a knee boss 46 to which is pivotally connected, preferably by a ball and socket coupling connection 47, the upper end of a connecting rod 48, the lower end of which is pivotally connected, also preferably by a ball and socket coupling connection 49, to said actuator lever 41.

In the operation of the mechanism, as thus far described, a suitably scored paper blank B is fed intermediate the raised forming plunger 8 and the upwardly open mouth of the forming throat defined by the folder plates 19-20 and presser plates 33-34, while said plates are disposed in initial retracted positions (see Figs. 3 and 5). Before the blank B is thus fed into position for forming a container therefrom, such parts thereof as are to be lapped and adhered together are coated with an adhesive, such as a suitable glue, in manner familiar to those skilled in the art. The means for thus glue coating and feeding the blank are not shown, and may comprise any suitable mechanism already well known to the art for effecting such purposes.

For the purpose of illustration, the blank B and container formed therefrom shown in the accompanying drawings are substantially the same as disclosed in U. S. Patent 2,158,097, and the operation of the machine according to this invention will be described in connection with such type of blank and resultant container, al-

though by so doing no limitation of the novel mechanism to operation on such type of blank and resultant container is intended, since the mechanism in principle is equally well adapted to work upon any other specific form of blank and resultant container having a folded bottom formation to which strong sealing pressure is required or desired to be applied.

The blank B herein shown is adapted to produce a downwardly tapered container of rectangular cross-sectional shape, having a folded and sealed closed bottom portion. To this end, the blank is of trapezoidal shape, and comprises a single or integral sheet of paper or other suitable material scored to provide opposed side walls *a* and *b* and an intermediate bottom wall *c*, with internal side wall forming flaps *d* respectively springing from lateral margins of side wall *a* and external side wall forming flaps *e* respectively springing from the lateral margins of side wall *b*, and with interfoldable bottom underlap portions *f* springing from the bottom margins of cooperating internal and external side wall forming flaps *d* and *e* and intervening margins of bottom wall *c*. The walls *a* and *b* include suitably scored upper end sections to provide gusset formations when the top end of the resultant container is closed, one of said sections, as *g*, being additionally shaped and scored to provide a pouring spout portion as and for the purposes fully described in the aforesaid U. S. Patent 2,158,097.

The blank B, when fed to position above the forming throat and beneath the forming plunger 8, is so disposed that its bottom wall section *c* is aligned beneath said plunger, with the side wall *a* overlying the upper end of the folder plate 19 and the side wall *b* overlying the upper end of the folder plate 20. Affixed to the upper corners of the said folder plate 19, to extend angularly relative to the inner operative face thereof, are suitably shaped fold turning and guiding portions 50, which function to turn and guide the bottom underlap portions *f* of the blank for downward projection relative to the bottom wall section *c* of the latter, as well as to turn inwardly the internal side wall forming flaps *d*, when the blank is thrust downwardly by the descending plunger 8 into the forming throat. Affixed to the upper corners of the folder plate 20, to extend angularly relative to its inner operative face, are suitably shaped fold turning and guiding fingers 51, which function to turn the external side wall forming flaps *e* in overlapping relation to the inturned internal side wall forming flaps *d*, during the manipulation of the blank B while the descending plunger 8 forces the same downwardly into the forming throat.

The operative face of the folder plate 19 is formed, adjacent to its upper end, with a suitably shaped female die portion 52, with which cooperates a male die portion 53 provided on that face of the plunger 8 which opposes said folder plate 19. Said male and female die portions operate to form the section *g* of the blank B into a pouring spout formation with which the formed container may be provided. If provision of such pouring spout section is not desired in the finished container, then said male and female die portions may be omitted.

The blank B having been positioned beneath the raised forming plunger 8 and over the top of the forming throat, timed actuation of the forming plunger 8 causes the same to descend and enter into said forming throat. In its de-

scent, the lower end of the plunger 8 engages the bottom section c of blank B so as to carry the blank downward therewith and into said forming throat. As the blank B moves downward with the plunger 8, the side wall a, by engagement with the folder plate 19, will be upswung relative to the bottom section c, and, in like manner, the side wall b, by engagement with the folder plate 20, will also be upswung. As the side walls a and b are thus upturned, the fold turning and guiding portions 50, associated with the folder plate 19, will engage and turn laterally inward the internal side wall forming flaps d, and the fold turning and guiding fingers 51, associated with the folder plate 20, will engage and turn laterally inward the external side wall forming flaps e. Due to the respective shapes of said fold turning and guiding portions 50 and of said fold turning and guiding fingers 51, the former act somewhat in advance of the latter, whereby the inturning of the internal side wall forming flaps d is first initiated so as to lead the inturning of the external side wall forming flaps e, thus assuring that said external flaps e will exteriorly overlap the inturned internal flaps d. Owing to the hinging connections, provided by suitable scoring, which join the various parts of the bottom underlap portions f with each other and with the bottom edges of said flaps d and e and the intervening edge of the bottom section c, said bottom underlap portions will be folded together and will be guided by the fold turning and guiding portions 50 to assume a downturned relation to the bottom section c, whereby the same are initially disposed to project substantially perpendicular to the latter and in the plane of the inturned internal and external side wall forming flaps d and e (see full line representation thereof in Figs. 7 and 8).

As the forming plunger 8 reaches the limit of its operative down-stroke, the timed operation of the folder plate actuating means functions to move said folder plates 19 and 20 inward toward opposite sides of the forming plunger 8, thus gripping the side walls a and b therebetween, and causing the internal and external side wall forming flaps d and e to completely overlapped relation. Following such operation of the folder plates 19 and 20, the timed operation of the presser plate actuating means functions to move said presser plates 33 and 34 toward transversely opposite sides of the forming plunger 8 over which the overlapped side wall forming flaps d and e extend, thus forcefully pressing said flaps d and e together and against the forming plunger 8. Since one or both meeting of said overlapped flaps d and e bear a coating or coatings of adhesive previously applied thereto as heretofore mentioned, these flaps d and e, when thus pressed together are caused to firmly adhere.

As the folder plate 19 exerts its thrusting pressure against the opposed side of the plunger 8, the female and male die portions 52-53, respectively carried by said folder plate 19 and the plunger 8, operatively engage the scored section g of the side wall a so as to form the same into the pouring spout formation heretofore referred to.

In the operation and timing of the plunger 8 and cooperating folder plates 19-20 and presser plates 33-34, sufficient period of dwell at the above described operative relative positions is provided for to permit sufficient setting of the adhesive joining the flaps d and e, as well as to allow time for bottom folding and pressing

operations through agencies now about to be described.

Means is provided for upfolding the bottom underlap portions f against the underside of the bottom section c. This means comprises slidably reciprocable tuck plates 54 and 55 respectively associated with the presser plates 33 and 34, which are provided with guideway openings 56 in their lower ends through which the operative forward end portions of said tuck plates move to engage the downwardly projecting bottom underlap portions f so as to upswing the same flatly against the underside of the bottom section c. Each tuck plate is provided with a tail-piece 57 slidably supported in a guide bearing 58 secured to an underside portion of the table 1. The means for producing operative movements of said tuck plates comprises a transverse rock shaft 59 supported in bearings 60 secured to an underside portion of the table 1. Fixed on said rock shaft 59 are a pair of lever arms 61 between which extends an oscillator shaft 62 adapted to be raised and lowered by the rocking movement of said rock shaft as transmitted thereto through the supporting lever arms 61. Mounted beneath and transversely of each tuck plate, in fulcruming bearing means 63 secured to an underside portion of the table 1, is a pivot shaft 64 of a bell-crank lever system. Each bell-crank lever system comprises an upper arm 65, having a bifurcate end portion to straddlingly engage a cross-pin 66 carried by the served tuck plate, and a lower arm 67, the free end of which is pivotally connected with a coupling collar 68 affixed to said oscillator shaft 62. Timed actuation of said rock shaft 59, with consequent timed rise and fall of said oscillator shaft 62, is produced by a race cam 69 mounted on the drive shaft 4, the race of which is engaged by the roller stud 70 of the fork 71 of a connecting rod 72, the upper end of the latter being pivotally connected with one of said lever arms 61. In operation, at a proper time said oscillator shaft 62 is upswung, thus turning the bell-crank lever systems so as to swing inwardly the upper arms 65 thereof and thereby cause the tuck plates 54 and 55 to slide forward with upswinging effect upon the bottom underlap portions f, whereby the latter are folded against the under exterior face of the bottom section c, and held there until a bottom presser mechanism engages the same to press the same forcefully home to firmly adhere the interfolded parts thereof one to the other and to said bottom section c, the various meeting faces of the folds thereof and the surfaces exposed to engage said bottom section having been coated with adhesive prior to delivery of the blank B to the forming mechanism as already hereinabove indicated.

The means for applying strong bottom sealing pressure to the container, formed about and supported by the plunger 8 in the manner above described, can, with respect to the broad aspects of this invention, be variously made and actuated, and consequently, except as to specific claims thereto, the mechanism hereafter described to perform such function is to be considered merely illustrative of one of many different possible embodiments adapted for the purpose.

The illustrative form of the bottom sealing pressure applying means, as shown in the accompanying drawings, comprises a pedestal bearing 73 affixed to a supporting bridge plate 74 with which the framework 2 is provided, or otherwise

strongly and rigidly supported, in a position beneath the forming plunger 8, and in alignment with the vertical longitudinal axis thereof. Said pedestal bearing embraces and supports the drive shaft 4 against spring. Said bearing pedestal is provided with upstanding laterally spaced knuckle bearing portions 74 which are disposed in line with the forming plunger 8, and with forwardly offset laterally spaced bracket bearing portions 75. Pivotally connected with a fulcrum pin 76, which is supported by and between said knuckle bearing portions 74, is the lower end of a toggle-joint means comprising, a lower toggle lever 77 and an upper toggle lever 78, the meeting ends of which are pivotally interconnected by a knee pin 79. Pivotally connected with the ends of said knee pin 79 are draw links 80. Supported by a fulcruming shaft 81 journaled in said bracket bearing portions 75 are a pair of upwardly extending actuator levers 82, to the free ends of which said draw links 80 are respectively suitably coupled. One of said actuator levers 82 is provided with a bell-crank arm 83, having at its free end a roller 84 adapted to be operatively engaged by an actuating cam 85 which is fixed on and driven by said drive shaft 4. A pull spring 86 is connected with said last mentioned actuator lever 82 and anchored to the machine framework 2. Said pull spring 86 maintains said bell-crank arm 83 and its roller 84 in operative following engagement with the actuating cam 85. Pivotally connected with the upper free end of the upper toggle lever 78 by a wrist pin 79' is the yoke portion 87 of a presser head 88. Said presser head 88 and its yoke portion 87 is capable of a rocking movement about its pivotal connection with the upper toggle lever 78; such movement, in rearward direction, being influenced by a pull spring 89 connected between said yoke portion and toggle lever, and being limited by engagement of said yoke portion with a stop shoulder 90 with which said upper toggle lever 78 is provided. Secured to or otherwise formed in rigid connection with the yoke portion 87 are forwardly projecting presser head guide plates 91, the forward free edges of which provide guide runners 92 disposed parallel to the longitudinal axis of the presser head. Affixed to and pendant from the table 1 is a rigidly supported abutment member 93 having slideway means 94 disposed parallel to the longitudinal axis of the forming plunger 8. When the toggle-joint means is swung into operative position subject to actuation whereby said presser head 88 is upwardly and forcefully thrust against the bottom end of a container, which has been formed about the forming plunger 8 in the manner above described, the guide runners 92 of guide plates 91 will slidably engage the slideway means 94 of abutment member 93 so as to thereby maintain the presser head 88 in axial alignment with the forming plunger 8 during the upthrusting movement of said presser head.

To assist the collapsing movement of the toggle levers 77-78 of the toggle-joint means, the same are interconnected by a pull spring 95, the ends of which are anchored to ears 96 and 97 with which said toggle levers 77-78 are respectively provided.

Affixed to the upper surface of the presser head 88 is a presser plate 98, the operative face of which is shaped, in intaglio, to conform to the contours of the bottom underlap portions *f* as upswung or folded against the bottom section *c*, thus assuring application of uniform bottom

sealing pressure to the container bottom as formed by these parts. In Fig. 9 a plan view of the container bottom is shown, and in Fig. 10 a correspondingly shaped face, in intaglio, of said presser plate 98 is shown.

Means is provided for rigidly bracing the forming plunger 8, in its lowered position with the container formed about the same, against back pressure in resistance to the strong upthrust of the presser head 88, when the latter is actuated to apply bottom sealing pressure to said container. This means comprises a transverse bracing head 99 suitably affixed to the upper end of the forming plunger 8. Said bracing head is provided with outwardly and oppositely projecting tapered abutment shoulders 100. Slidably mounted in ways 101 provided respectively in opposite side portions of the overhead frame 5, for reciprocation therein toward and from the lowered forming plunger 8, are brace bolts 102 provided at their free ends with tapered lock nosings 103 shaped to conform to and operatively engage said abutment shoulders 100 of the bracing head 99. Said brace bolts 102 are coupled by a yieldable connection to their tail-pieces 104. In the illustrative form thereof shown in Fig. 4, each said yieldable connection comprises a coupling stud 105 extending forwardly from the tail-piece 104 to telescopically slide in a socket 106 provided in the rear end portion of the associated brace bolt 102. The sliding movement of said brace bolt relative to said stud is limited by a pin and slot connection 107 by which said parts are joined. A compression spring 108 is mounted about the stud intermediate the opposed ends of the brace bolt 102 and associated tail-piece 104. The means for producing operative movements of said brace bolts 102 toward and from the lowered forming plunger 8 comprises, in cooperation with the tail-piece 104 of each, a transverse counter-shaft 109 journaled in and between bearings 110 with which said overhead frame 5 is provided. This counter-shaft 109 is driven from the drive shaft 4 by a chain and sprocket transmission 111, or by any other suitable transmission means. Fixed on said counter-shaft 109, so as to be rotated thereby, is a cam drum 112. Pivotally supported on a fulcrum bracket 113, affixed to and projecting from said overhead frame 5, is an actuating lever. The upper arm 114 of said lever is provided with a roller stud adapted to be operatively engaged by the race of the cam drum 112. The lower arm 115 of said lever is pivotally coupled, by a pin and slot connection 116 with a tail-piece 104 of a brace bolt 102.

In the operation of the container bottom sealing mechanism, after the forming plunger 8 has reached the downward limit of its operative stroke, whereby a container is formed about the same in the manner above described, by the timed operation of the actuating means therefor, said brace bolts 102 are advanced so as to operatively engage the lock nosings 103 thereof over the abutment shoulders 100 of the bracing head 99 with which the forming plunger 8 is provided. Owing to yieldable connection between the brace bolts 102 and their tail-pieces 104, and to the conforming inclined faces of the lock nosings 103 and abutment shoulders 100, a strong wedging thrust of said brace bolts 102 against the bracing head 99 is exerted, whereby all play or looseness is eliminated, with the result that a strong bracing and backing thrust against up-

ward yielding movement of the forming plunger under back pressure exerted thereon by the bottom sealing mechanism is assured.

By the timing operation of the actuating cam 85, which rotates in clockwise direction as viewed in Figs. 2 and 3, after the forming plunger 8 has been locked against yielding to back pressure as above set forth, the engagement of an intermediate step 85' of said actuating cam 85 with the roller 84 of the bell-crank arm 83 imparts an initial outward swinging movement to the actuator levers 82 which is transmitted through the draw links 80 to the toggle-joint means, whereby the same is swung forward from an initial back swung position, thus bringing the guide runners 92 of the presser head guide plates 91 into operative engagement with the slideway means 94 of the abutment member 93, thereby swinging the presser head 88 into alignment with the forming plunger 8 ready for operation. Continued rotation of the actuating cam 85 thereafter carries its high part into engagement with said bell-crank arm 83 to thereby impart a further advanced outward swinging movement to the actuator levers 82, which, being transmitted by the draw links 80 to the knee of the toggle-joint means, operates to move the toggle-levers 77-78 thereof toward alignment, thus exerting an upward thrust upon the presser head 88 so as to carry the same into engagement with the container bottom and thereafter exert an exceedingly forceful pressure thereon to seal down the bottom underlap portions *f* to the bottom section *c* and to each other.

As the actuating cam 85 continues its rotative cycle, the low part thereof moves into engagement with said bell-crank arm 83, thus permitting an inward or return swinging movement of the actuator levers 82, under the pull of the spring 86, which, being transmitted by the draw links 80 to the knee of the toggle-joint means, not only collapses the toggle-levers 77-78 to downwardly retract the presser head 88, but also swings back the toggle-joint means and presser head, so as to move the latter to rearwardly offset position out of alignment with the forming plunger 8, to thereby open an unobstructed path for the discharge by gravity of the completed container, when the latter is stripped from the forming plunger (see Fig. 3).

A deflector plate element 117 is secured to the ear 97 of the upper toggle lever 78. This deflector plate element 117 is positioned by the back swing of the toggle-joint means to the above described initial offset position, beneath the path of movement of a container that has been stripped from the forming plunger 8, and functions to shunt the falling container outwardly for discharge from the machine.

Upon completion of the bottom sealing of the container, the brace bolts 102 are retracted by the timed operation of their actuating means, thus freeing the forming plunger 8 for upward retraction to normal initial raised position.

Means is provided for stripping the completed container from the forming plunger 8 as the latter is upwardly retracted. A simple means for accomplishing this purpose is shown in Fig. 2, and comprises resilient stripper hooks 118 respectively affixed to the faces of the folder plates 19 and 20, the hook portions of which are adapted to engage the upper margins of opposite sides of the completed container so as to hold the same against upward movement in company with the

upwardly retracted forming plunger 8. The completed container being thus held by said stripper hooks 118, the upward movement of the retracted forming plunger 8 will withdraw said plunger from the interior of the container, thus freeing the latter so that it may drop away for discharge out of the machine. Once the container is thus loosened and separated from the forming plunger, the presser plates 19-20 and presser plates 33-34 are retracted to normal initial open positions (see Fig. 3) by the timed operation of their actuating means, whereupon the completed container is discharged, a succeeding blank *B* is fed into position, and the cycle of container forming operations by the various mechanisms is repeated.

Another optional means for stripping a completed container from the forming plunger is shown in Fig. 11, and comprises a shedder plunger rod 119 slidable axially through the forming plunger 8 and its plunger rod 7, the latter in this case being of hollow or tubular form to provide an internal cylindrical chamber 120 into which said shedder plunger rod 119 upwardly extends. To the lower end of said shedder plunger rod 119 is affixed a transverse shedder pad 121, which is normally received in a socket 122 with which the bottom end of the forming plunger 8 is provided, being thus normally countersunk in flush relation to the bottom surface of the latter. Affixed to the upper end portion of the shedder plunger rod 119 within the chamber 120 is a collar 123 having a finger 124 exteriorly projecting therefrom through a slotway 125 provided in the wall of said plunger rod 7. Said finger 124 terminates in a nosing 126. Disposed around said shedder plunger rod 119 between the bottom of said chamber 120 and said collar 123 is a compression spring 127 which yieldably retains said shedder plunger rod 119 uplifted to dispose the shedder pad 121 in normal retracted position within the socket 122 at the bottom end of said forming plunger 8. Supported in a predetermined position by a bracket 128 which is affixed to a suitable stationary part of the machine, as e. g. to the overhead frame 5, is a pivoted detent lever having at its upper end a hooked detent portion 129 adapted at proper times to engage said nosing 126, being yieldably urged toward such engagement by a suitably anchored spring means 130. At its lower end said detent lever is provided with a tail-piece 131 to cooperate with a trip bar 132 carried by and movable with the plunger rod 7 of the forming plunger 8. If desired, in order to cushion the retractive movement of said shedder plunger rod 119 and shedder pad 121, the former may be provided with a piston 132 operative in the upper closed end of the cylindrical chamber 120, said end being provided with any suitable form of checking air vent means (not shown) for slowly venting air compressed therein by the sudden rise of said piston 132. In the operation of this type container stripping means, when the forming plunger 8 reaches the limit of its downward operative stroke, whereby a container is formed on and about the same, the nosing 126 is carried downwardly to a position wherein it is engaged by the hooked detent portion 129 of the detent lever, and the trip bar 132 is likewise carried down to a position which frees said detent lever for such engagement with the nosing 126. Upon completion of the bottom sealing operations upon the container formed on and about the forming plunger 8, the actuating means controlling the movements of the latter functions to upwardly retract the same. As the forming

plunger 8 rises, owing to the fact that the shedder plunger rod 119 is detained against upward movement therewith by the detent lever, the shedder pad 121 remains stationary while the forming plunger 8 moves upwardly away therefrom, and consequently the completed container is likewise held stationary relative to the rising forming plunger 8, thus being stripped away therefrom. After the stripping of the completed container is thus effected, and as the forming plunger and plunger rod 7 continues its upward movement, the trip bar 132 will be carried upwardly against the tail-piece 131 of the detent lever so as to rock the latter and thus release its hooked detent portion 129 from holding relation to the nosing 126. Said nosing 126 being released, the spring 122, which has been compressed by the upward movement of the forming plunger and plunger rod 7 relative to the arrested shedder plunger rod 119, exerts by its stored tension on upward thrust upon the collar 123 to thereby retract the shedder plunger rod 119 and shedder pad 121 to normal initial position ready for a repetition of the described container forming and stripping operations.

We are aware that many changes could be made in the above described constructions, and that many widely different embodiments of this invention could be made without departing from the scope thereof as defined in the following claims. It is therefore intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, and means to apply bottom sealing pressure to said thus folded bottom underlap portions.

2. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means movable into and out of alignment with said forming plunger for applying bottom sealing pressure to said thus folded bottom underlap portions to complete the container, and means to strip the completed container from the forming plunger for discharge from the mechanism after said bottom sealing pressure applying means is moved out of alignment with said forming plunger.

3. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming

throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means to apply bottom sealing pressure to said thus folded bottom underlap portions, and means movable into and out of engagement with said forming plunger operative when engaged therewith to hold the same against back pressure under the thrust of said bottom sealing pressure applying means.

4. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means movable into and out of alignment with said forming plunger for applying bottom sealing pressure to said thus folded bottom underlap portions to complete the container, means movable into and out of engagement with said forming plunger operative when engaged therewith to hold the same against back pressure under the thrust of said bottom sealing pressure applying means, and means to strip the completed container from the forming plunger for discharge from the mechanism after said bottom sealing pressure applying means is moved out of alignment with said forming plunger.

5. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means to apply bottom sealing pressure to said thus folded bottom underlap portions, said latter means comprising toggle-joint means having an anchored lower end and a presser head carried by its upper free end, pivoted actuator lever means, draw link means interconnecting said actuator lever means with the knee of said toggle-joint means, said actuator lever means including a bell-crank arm, and driven cam means cooperating with said bell-crank arm, and means movable into and out of engagement with said forming plunger operative when engaged therewith to hold the same against back pressure under the thrust of said bottom sealing pressure applying means.

6. In mechanism for the purposes described and as defined in claim 3 wherein, said bottom sealing pressure applying means includes a presser head having an operative face shaped in intaglio to conform to the container bottom and bottom underlap portions overlying the same.

7. In mechanism for the purposes described and as defined in claim 5 wherein, the presser head of the bottom sealing pressure applying means is provided with an operative face shaped in intaglio to conform to the container bottom and bottom underlap portions overlying the same.

8. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal to-

gether portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means to apply bottom sealing pressure to said thus folded bottom underlap portions, said latter means comprising toggle-joint means, means to which one end of said toggle-joint means is pivotally connected, a presser head mounted on the opposite end of said toggle-joint means, pivoted actuator lever means, draw-link means interconnecting said actuator lever means with the knee of said toggle-joint means, spring means to back swing said actuator lever means to yieldably dispose the collapsed toggle-joint means in a position out of alignment with the forming plunger and the container formed about the same, and means to operate said actuator lever means so as to align said toggle-joint means with said forming plunger and container and then to operatively actuate the same.

9. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, an endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means to apply bottom sealing pressure to said thus folded bottom underlap portions, said latter means comprising toggle-joint means, means to which one end of said toggle-joint means is pivotally connected, a presser head mounted on the opposite end of said toggle-joint means, pivoted actuator lever means, draw-link means interconnecting said actuator lever means with the knee of said toggle-joint means, spring means to back swing said actuator lever means to yieldably dispose the collapsed toggle-joint means in a position out of alignment with the forming plunger and the container formed about the same, and means to operate said actuator lever means so as to align said toggle-joint means with said forming plunger and container and then to operatively actuate the same, and means movable into and out of engagement with said forming plunger operative when engaged with the latter to hold the same against back pressure under the thrust of said bottom sealing pressure applying means.

10. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, and endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means to apply bottom sealing pressure to said thus folded bottom underlap portions, said latter means comprising toggle-joint means, means to which one end of said toggle-joint means is pivotally connected, a presser head pivotally mounted on the opposite

end of said toggle-joint means yieldably subject to rocking movement to a back-swung position relative thereto when said toggle-joint means is collapsed, pivoted actuator lever means, draw-link means interconnecting said actuator lever means with the knee of said toggle-joint means, spring means to back swing said actuator lever means to yieldably dispose the collapsed toggle-joint means in a position out of alignment with the forming plunger and the container formed about the same, means to operate said actuator lever means so as to align said toggle-joint means with said forming plunger and container and then to operatively actuate the same, and means for operatively maintaining said presser head during its pressure applying movement in alignment with said plunger and container, and means movable into and out of engagement with said forming plunger operative when engaged with the latter to hold the same against back pressure under the thrust of said presser head.

11. Mechanism for the purposes described and as defined in claim 9 including means to strip the completed container from the forming plunger for discharge from the mechanism after said toggle-joint means is collapsed and back swung out of alignment with said forming plunger.

12. Mechanism for the purposes described and as defined in claim 10 including means to strip the completed container from the forming plunger for discharge from the mechanism after said toggle-joint means and its presser head is collapsed and back swung out of alignment with said forming plunger.

13. In mechanism for the purposes described and as defined in claim 9 wherein, the presser head of the bottom sealing pressure applying means is provided with an operative face shaped in intaglio to conform to the container bottom and bottom underlap portions overlying the same.

14. In mechanism for the purposes described and as defined in claim 10 wherein, the presser head of the bottom seating pressure applying means is provided with an operative face shaped in intaglio to conform to the container bottom and bottom underlap portions overlying the same.

15. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during the forming operations, and endwise open forming throat means, a reciprocable forming plunger to carry the blank into said forming throat means with container shaping effect, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of the blank over the bottom of the shaped container, means to apply bottom sealing pressure to said thus folded bottom underlap portions, said latter means comprising toggle-joint means, means to which one end of said toggle-joint means is pivotally connected, a presser head pivotally mounted on the opposite end of said toggle-joint means yieldably subject to rocking movement to a back-swung position relative thereto when said toggle-joint means is collapsed, pivoted actuator lever means, draw-link means interconnecting said actuator lever means with the knee of said toggle-joint means, spring means to back swing said actuator lever means to yieldably dispose the collapsed toggle-joint means in a position out of alignment with

the forming plunger and the container formed about the same, said actuator lever means including a bell-crank arm, driven cam means cooperative with said bell-crank arm and shaped so as to operate said actuator lever means to first draw the collapsed toggle-joint means into operative alignment with said forming plunger and the container thereon and thereafter to expand said toggle-joint means to thrust said presser head into pressure applying engagement with the container bottom, and means for maintaining said presser head during its pressure applying movement in alignment with said plunger and container, and means movable into and out of engagement with said forming plunger operative when engaged therewith to hold the same against back pressure under the thrust of said presser head.

16. In mechanism for the purposes described and as defined in claim 15 wherein, the presser head of the bottom sealing pressure applying means is provided with an operative face shaped in intaglio to conform to the container bottom and bottom underlap portions overlying the same.

17. Mechanism for the purposes described and as defined in claim 15 including means to strip the completed container from the forming plunger for discharge from the mechanism after said toggle-joint means and its presser head is collapsed and back-swung out of alignment with said forming plunger.

18. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during forming operations, a drive shaft, a vertically reciprocable forming plunger, means for producing timed reciprocation of said plunger including a cam on said drive shaft, an endwise open forming throat means with which said plunger cooperates, said forming throat means comprising opposed folder plates movable toward and from certain faces of said plunger when the latter is entered therebetween, means for producing timed movements of said folder plates including cam means on said drive shaft, opposed pressure plates movable toward and from other faces of said plunger, and means for producing timed movements of said pressure plates including actuating cam means on said drive shaft, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of a blank formed about the plunger into a container formation over the bottom of the latter, means for producing timed movements of said folding means including additional actuating cam means on said drive shaft, means to apply bottom sealing pressure to the said folded bottom underlap portions, means movable into and out of engagement with said forming plunger operative when engaged therewith to hold the same against back pressure under the thrust of said bottom sealing pressure applying means, and means for producing timed movements of said holding means including a counter-shaft driven from said drive shaft and actuating cam means on said counter-shaft.

19. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during forming operations, a drive shaft, a vertically reciprocable forming plunger, means for producing timed reciprocation of said

plunger including a cam on said drive shaft, an endwise open forming throat means with which said plunger cooperates, said forming throat means comprising opposed folder plates movable toward and from certain faces of said plunger when the latter is entered therebetween, means for producing timed movements of said folder plates including cam means on said drive shaft, opposed pressure plates movable toward and from other faces of said plunger, and means for producing timed movements of said pressure plates including actuating cam means on said drive shaft, means adjacent to the lower end of said forming throat means to fold bottom underlap portions of a blank formed about the plunger into a container formation over the bottom of the latter, means for producing timed movements of said folding means including additional actuating cam means on said drive shaft, means to apply bottom sealing pressure to the said folded bottom underlap portions, said latter means comprising toggle-joint means, means to which one end of said toggle-joint means is pivotally connected, a presser head mounted on the opposite end of said toggle-joint means, pivoted actuator lever means, draw-link means interconnecting said actuator lever means with the knee of said toggle-joint means, spring means to back swing said actuator lever means to yieldably dispose the collapsed toggle-joint means and presser head in a position out of alignment with the forming plunger and the container formed about the same, said actuator lever means including a bell-crank arm, a cam on said lever shaft cooperative with said arm, said cam being shaped so as to operate said actuator lever means to first draw the collapsed toggle-joint means into operative alignment with said forming plunger and the container thereon and thereafter to expand said toggle joint means to thrust said presser head into pressure applying engagement with the container bottom, means movable into and out of engagement with said forming plunger operative when engaged therewith to hold the same against back pressure under the thrust of said bottom sealing pressure applying means, means for producing timed movements of said holding means including a counter-shaft driven from said drive shaft and actuating cam means on said counter shaft, and means to strip the completed container from the forming plunger for discharge from the mechanism after said toggle-joint means and its presser head is collapsed and back-swung out of alignment with said forming plunger.

20. In mechanism for forming a paper container from an individual blank having applications of adhesive thereon to secure and seal together portions thereof which are interfolded and lapped during forming operations, a drive shaft, a vertically reciprocable forming plunger, means for producing timed reciprocation of said plunger including a cam on said drive shaft, an endwise open forming throat means with which said plunger cooperates, said forming throat means comprising opposed folder plates movable toward and from certain faces of said plunger when the latter is entered therebetween, means for producing timed movements of said folder plates including cam means on said drive shaft, opposed pressure plates movable toward and from other faces of said plunger, and means for producing timed movements of said pressure plates including actuating cam means on said drive shaft, means adjacent to the lower end

of said forming throat means to fold bottom underlap portions of a blank formed about the plunger into a container formation over the bottom of the latter, means for producing timed movements of said folding means including additional actuating cam means on said drier shaft, means movable into and out of alignment with said forming plunger for applying bottom sealing pressure to said folded bottom underlap portions to complete a container, means movable into and out of engagement with said forming

5 plunger operative when engaged therewith to hold the same against back pressure under the thrust of said bottom sealing pressure applying means, and means to strip the completed container from the forming plunger for discharge from the mechanism after said bottom sealing pressure applying means is moved out of alignment with said forming plunger.

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